

## **Gravity and Motion**

Aristotle believed that objects with more mass fell to the Earth quicker.

Galileo disagreed after watching hail of different sizes fall to the ground.

He believed that all objects fall to the Earth at the same rate.

They fall at the same rate because the acceleration due to gravity is the same for every object = **9.8 m/s/s**

**The change in velocity of a falling object  
= gravity x time**

## **Air Resistance**

The force that opposes the motion of an object through the air.

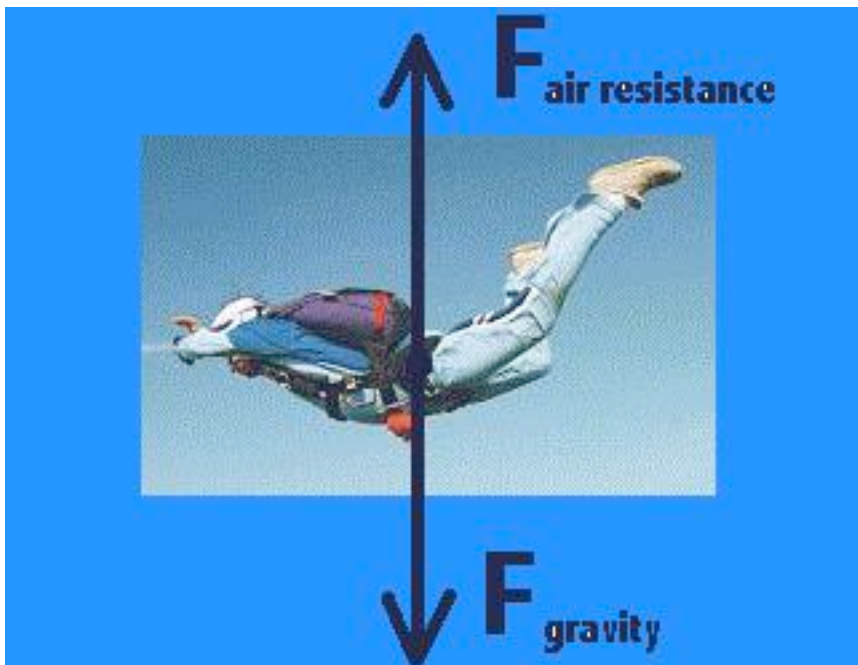
It pushes up and gravity pulls down

Depends on size, shape and speed



Acceleration of an object (the object gaining speed) stops at **terminal velocity**

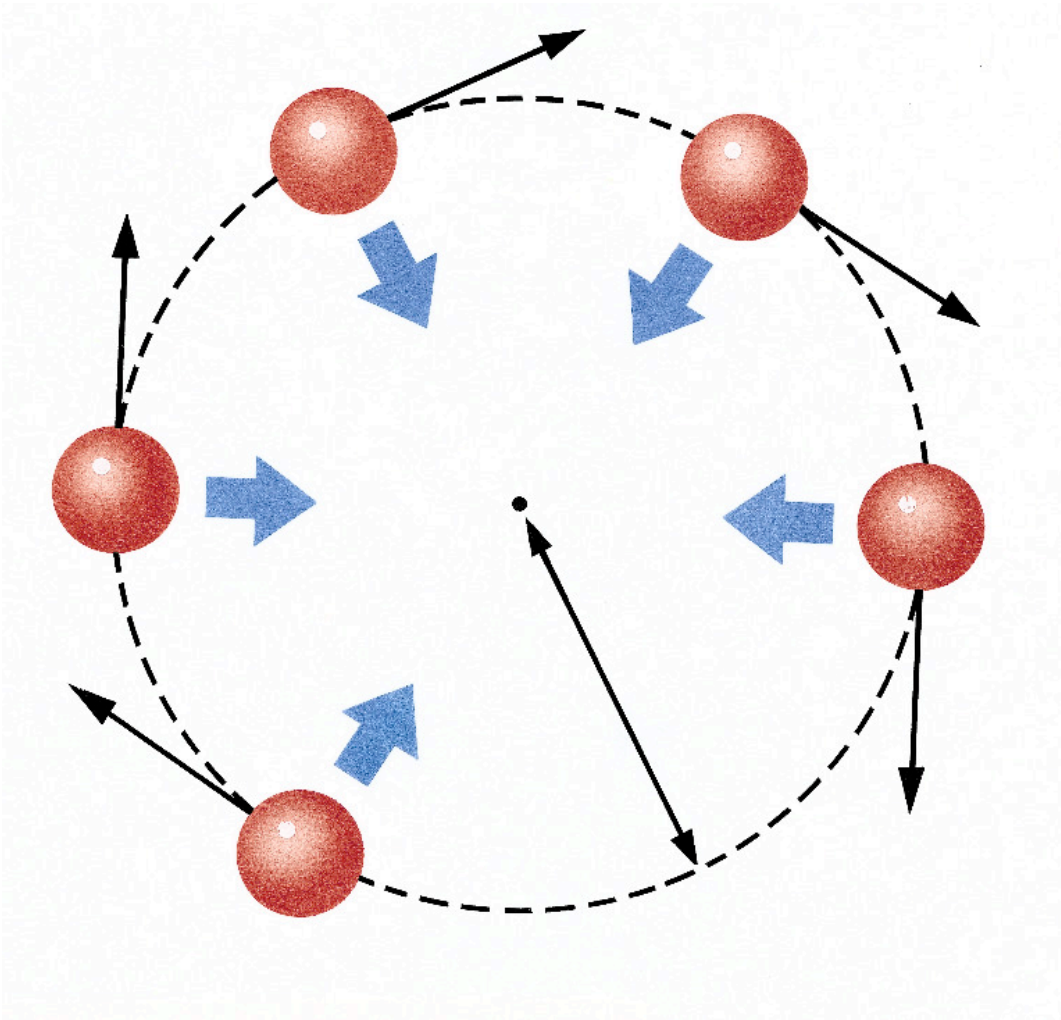
When the force of the air resistance equals the downward force of gravity, terminal velocity occurs. The object then falls at a constant rate.



When there is no air resistance- gravity only pulls on the object. This is called **free fall**  
This can happen in space and a vacuum

Orbit is caused by the combination of two motions:

Horizontal and Vertical  
Centripetal Force



Velocity needed to orbit Earth: **17,921 mph**

Velocity needed to escape Earth's  
gravitational pull: **24,606 mph**

# Projectile Motion

The curved motion of an object launched near the surface of the earth

Ex. An arrow that is shot

A thrown baseball

A leaping frog

